In the Claims:

Applicant has submitted a new complete claim set showing marked up claims with insertions indicated by underlining and deletions indicated by strikeouts and/or double bracketing.

Please cancel claims 36-67, 69-90 and 92-111 without prejudice or disclaimer.

Please amend claims 22, 114-118 and 121

1. (Original) A method for analyzing a polymer comprising

contacting the polymer with a conjugate comprising a nucleic acid tag molecule and a nucleic acid binding agent,

allowing the nucleic acid binding agent to bind to the polymer non-specifically, and

allowing the nucleic acid tag molecule to bind specifically to the polymer, and

determining a pattern of binding of the conjugate to the polymer.

2. (Original)The method of claim 1, further comprising allowing the nucleic acid binding agent to translocate along the polymer.

3. (Original) The method of claim 1, wherein the nucleic acid binding agent binds to the polymer non-specifically.

4. (Original) The method of claim 1, wherein the polymer is a nucleic acid molecule.

5. (Original) The method of claim 1, wherein the polymer is DNA or RNA.

6. (Original) The method of claim 1, wherein the nucleic acid tag molecule is selected from the group consisting of a peptide nucleic acid (PNA), a locked nucleic acid (LNA), a DNA, an RNA, a bisPNA clamp, a pseudocomplementary PNA, and a LNA-DNA co-polymer.

7. (Original) The method of claim 1, wherein the nucleic acid tag molecule is 5-50 residues in length.

8. (Original) The method of claim 1, wherein the nucleic acid tag molecule and the nucleic acid binding agent are covalently linked to each other.

9. (Original) The method of claim 1, wherein the nucleic acid tag molecule and the nucleic acid binding agent are conjugated using a linker molecule.

10. (Original) The method of claim 1, wherein the nucleic acid binding agent is an enzyme.

11. (Original) The method of claim 10, wherein the enzyme is selected from the group consisting of a DNA polymerase, an RNA polymerase, a DNA repair enzyme, a helicase, a nuclease, and a ligase.

12. (Original) The method of claim 10, wherein the enzyme lacks the ability to modify the nucleic acid tag molecule or the polymer.

13. (Original) The method of claim 1, wherein the nucleic acid tag molecule is labeled with a detectable moiety.

14. (Original) The method of claim 1, wherein the nucleic acid binding agent is labeled with a detectable moiety.

15. (Original) The method of claim 1, wherein the nucleic acid tag molecule is labeled with a first detectable moiety, and the nucleic acid binding agent is labeled with a second detectable moiety.

16. (Original) The method of claim 1, wherein the polymer is labeled with a detectable moiety.

17. (Original) The method of claim 16, wherein the detectable moiety is a backbone specific label.

18. (Original) The method of claim 1, wherein the nucleic acid binding agent is not itself a detectable moiety.

19. (Original) The method of claim 1, wherein the pattern of binding of the conjugate to the polymer is determined using a linear polymer analysis system.

20. (Original) The method of claim 19, wherein the linear polymer analysis system comprises exposing the polymer to a station to produce a signal arising from the binding of the conjugate to the polymer, and detecting the signal using a detection system.

21. (Original) The method of claim 1, wherein the pattern of binding of the conjugate to the polymer is determined using fluorescence in situ hybridization (FISH).

22. (Currently Amended) The method of claim 13, ~~14, or 15~~, wherein the detectable moiety is selected from the group consisting of an electron spin resonance molecule, a fluorescent molecule, a chemiluminescent molecule, a radioisotope, an enzyme substrate, a biotin molecule, an avidin molecule, an electrical charged transferring molecule, a semiconductor nanocrystal, a semiconductor nanoparticle, a colloid gold nanocrystal, a ligand, a microbead, a magnetic bead, a paramagnetic particle, a quantum dot, a chromogenic substrate, an affinity molecule, a protein, a peptide, a nucleic acid, a carbohydrate, an antigen, a hapten, an antibody, an antibody fragment, and a lipid.

23. (Original) The method of claim 22, wherein the detectable moiety is detected using a detection system selected from the group consisting of an electron spin resonance detection system, a charge coupled device (CCD) detection system, a fluorescent detection system, an electrical detection system, a photographic film detection system, a chemiluminescent detection system, an enzyme detection system, an atomic force microscopy (AFM) detection system, a scanning tunneling microscopy (STM) detection system, an optical detection system, a nuclear magnetic resonance (NMR) detection system, a near field detection system, and a total internal reflection (TIR) detection system.

24. (Original) The method of claim 1, wherein the polymer is a non in vitro amplified nucleic acid molecule.

25. (Original) The method of claim 1, wherein the nucleic acid tag molecule is not an antisense molecule.

26. (Original) The method of claim 1, wherein the nucleic acid tag molecule does not hybridize to bacterial or viral specific sequences.

27. (Original) The method of claim 1, wherein the nucleic acid tag molecule is labeled with an agent.

28. (Original) The method of claim 27, wherein the agent is capable of cleaving a nucleic acid molecule.

29. (Original) The method of claim 28, wherein the agent is a photocleaving agent.

30. (Original) The method of claim 27, wherein the agent is able to modify a nucleic acid molecule.

31. (Original) The method of claim 1, wherein the nucleic acid binding agent is detected indirectly.

32. (Original) The method of claim 31, wherein the nucleic acid binding agent is detected indirectly using an antibody or an antibody fragment specific for the nucleic acid binding agent.

33. (Original) The system of claim 19, wherein the linear polymer analysis system is a single polymer analysis system.

34. (Original) The system of claim 1, wherein the pattern of binding of the conjugate to the polymer is determined using a method selected from the group consisting of Gene Engine™, optical mapping, and DNA combing.

35. (Original) A system for optically analyzing a polymer comprising:

an optical source for emitting optical radiation;

an interaction station for receiving the optical radiation and for receiving a polymer that is exposed to the optical radiation to produce detectable signals; and

a processor constructed and arranged to analyze the polymer based on the detected radiation including the signals,

wherein the polymer is bound to a conjugate comprising a nucleic acid tag molecule and a nucleic acid binding agent.

36.-67.(Canceled)

68. (Original) A method for analyzing a polymer comprising:

generating optical radiation of a known wavelength to produce a localized radiation spot;

passing a polymer through a microchannel;

irradiating the polymer at the localized radiation spot;

sequentially detecting radiation resulting from interaction of the polymer with the optical radiation at the localized radiation spot; and

analyzing the polymer based on the detected radiation,

wherein the polymer is bound to a conjugate of a nucleic acid tag molecule and a nucleic acid binding agent.

69.-90.(Canceled)

91. (Original) A method for analyzing a nucleic acid molecule, comprising:

exposing a nucleic acid molecule to a conjugate of a nucleic acid tag molecule and a nucleic acid binding enzyme,

allowing the nucleic acid binding enzyme to bind to the nucleic acid molecule,

allowing the nucleic acid tag molecule to bind to the nucleic acid molecule in a sequence-specific manner, and

determining a pattern of binding of the conjugate to the nucleic acid molecule.

92.-111.(Canceled)

112. (Original) A composition comprising

a conjugate of a nucleic acid tag molecule and a nucleic acid binding enzyme,

wherein a detectable moiety is present on the nucleic acid binding enzyme.

113. (Original) A composition comprising

a conjugate of a nucleic acid tag molecule and a nucleic acid binding enzyme,

wherein a detectable moiety is present on the nucleic acid tag molecule and wherein the nucleic acid binding enzyme is not the detectable moiety.

114. (Currently Amended) The composition of claim 112 ~~or 113~~, wherein the nucleic acid tag molecule and the nucleic acid binding agent are covalently linked to each other.

115. (Currently Amended) The composition of claim 112 ~~or 113~~, wherein the nucleic acid tag molecule and the nucleic acid binding agent are linked to each other using a linker molecule.

116. (Currently Amended) The composition of claim 112 ~~or 113~~, wherein the nucleic acid tag molecule is selected from the group consisting of a peptide nucleic acid (PNA), a locked nucleic acid (LNA), a DNA, an RNA, a bisPNA clamp, a pseudocomplementary PNA, and a LNA-DNA co-polymer.

117. (Currently Amended) The composition of claim 112 ~~or 113~~, wherein the nucleic acid binding enzyme is selected from the group consisting of a DNA polymerase, an RNA polymerase, a DNA repair enzyme, a helicase, a nuclease, and a ligase.

118. (Currently Amended) The composition of claim 112 ~~or 113~~, wherein the nucleic acid binding enzyme lacks the ability to modify a nucleic acid molecule.

119. (Original) The composition of claim 112, wherein the nucleic acid tag molecule is labeled with a second detectable moiety.

120. (Original) The composition of claim 113, wherein the nucleic acid binding enzyme is labeled with a second detectable moiety.

121. (Currently Amended) The composition of claim 112, ~~113, 119 or 120~~, wherein the detectable moiety is selected from the group consisting of an electron spin resonance molecule, a fluorescent molecule, a chemiluminescent molecule, a radioisotope, an enzyme substrate, a biotin molecule, an avidin molecule, an electrical charged transferring molecule, a semiconductor nanocrystal, a semiconductor nanoparticle, a ligand, a microbead, a magnetic bead, a paramagnetic molecule, a quantum dot, a chromogenic substrate, an affinity molecule, a protein, a peptide, nucleic acid, a carbohydrate, a hapten, an antigen, an antibody, an antibody fragment, and a lipid.

122. (Original) The composition of claim 121, wherein the detectable moiety is detected using a detection system selected from the group consisting of an electric spin resonance detection system, a charge coupled device detection system, a fluorescent detection system, an electrical detection system, a photographic film detection system, a chemiluminescent detection system, an enzyme detection system, an atomic force microscopy (AFM) detection system, a scanning tunneling microscopy (STM) detection system, an optical detection system, a nuclear magnetic resonance (NMR) detection system, a near field detection system, and a total internal reflection (TIR) system.

123. (Original) The method of claim 112, wherein the nucleic acid binding agent is detected indirectly.

124. (Original) The method of claim 123, wherein the nucleic acid binding agent is detected indirectly using an antibody or an antibody fragment specific for the nucleic acid binding agent.

125. (Original) A method for analyzing a polymer comprising

contacting the polymer with a conjugate comprising a nucleic acid tag molecule and a nucleic acid binding agent,

allowing the nucleic acid binding agent to bind to the polymer, and

allowing the nucleic acid tag molecule to bind specifically to the polymer,

wherein the nucleic acid binding agent is selected from the group consisting of a DNA repair enzyme, a helicase, a nuclease, and a ligase.

126. (Original) A method for labeling a polymer comprising

contacting the polymer with a conjugate comprising a nucleic acid tag molecule and a nucleic acid binding agent,

allowing the nucleic acid binding agent to bind to and translocate along the polymer, and

allowing the nucleic acid tag molecule to bind specifically to the polymer.

127. (Original) The method of claim 126, wherein the nucleic acid binding agent binds to the polymer non-specifically.

128. (Original) The method of claim 126, further comprising determining a pattern of binding of the conjugate to the polymer.